Module Registrar: Dr A M Galloway  
alex.galloway@strath.ac.uk

Other Lecturers Involved: Dr P Muñoz-Escalona

Module Description Form

ME403 (ME406 sem1/ ME418 sem2)  ENGINEERING MATERIALS SELECTION

Module Registrar: Dr A M Galloway  
alex.galloway@strath.ac.uk

Other Lecturers Involved: Dr P Muñoz-Escalona

Assumed Prerequisites: ME212 Materials Engineering and Design

Credit Weighting: 10 (ECTS 5)  
Semester: 1 and 2

Module Format and Delivery (HOURS i.e. 1 credit = 10hrs of study):

<table>
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<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Groupwork</th>
<th>External</th>
<th>Online</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
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Educational Aim

It is necessary for engineers to be aware of the importance of materials selection in the design process. This module aims to review the classes of available engineering materials, with some background to the underlying factors that determine their general properties. An introduction to the philosophy of materials selection in design will be given.

Learning Outcomes

On completion of the module the student is expected to be able to

LO1 understand the role of engineering material properties in selection

LO2 know how materials selection is achieved within the context of engineering design.

LO3 apply selection strategies to optimize material choice based on design constraints

LO4 develop a deeper understanding of the science and application of engineering materials

Syllabus

The module will teach the following:

This module will introduce an alternative approach to the traditional teaching methods of materials selection, which, in the past, developed an understanding of the physical and chemical nature of materials as a means of providing an understanding of their usefulness in Engineering Design.

This new approach starts at the other extreme by considering the classification of materials, provides an overview of their general or specific properties and provides an insight into their uses and selection criteria. This allows for the development of a more progressive understanding of the importance of materials selection in the design process.

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

LO1
C1 tests understanding of the development of basic material properties
C2 tests the use of material properties for
C3 tests knowledge on the interaction of function, shape, process, material in selection guidelines

LO2
C1 demonstrate understanding and application of basic material selection principles
C2 demonstrate knowledge and application of material and process property charts
C3 demonstrate knowledge of selection using screening and ranking

LO3
C1 demonstrate competence in applying more advanced strategies for material selection
C2 demonstrate competence in selecting materials for shape optimization
C3 demonstrate competence in material life cycle analysis

LO4
C1 demonstrate understanding of fundamental materials science over a range of common engineering alloys
C2 demonstrate understanding of phase diagram and how they are used to predict material properties
C3 demonstrate understanding of heat treatment, corrosion and welding engineering

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

12 Principles of Assessment and Feedback
(on Learning & Teaching web pages: www.strath.ac.uk/learnteach/informationforstaff/staff/assessfeedback/12principles/)

Formal, summative feedback will be provided by the return of examination marks to students at the end of the module (after summer exam board). [note:-exam scripts will not be returned to students and no individual or collective discussion of exam performance will be facilitated].

Informal feedback will be provided at regular tutorial sessions primarily through verbal discussion with individuals or groups on tutorial exercises attempted in advance by students (note:- to receive this feedback students should participate in these tutorials but attendance is not mandatory).

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
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<tr>
<th>Examinations</th>
<th>Courseworks</th>
<th>Projects</th>
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<td><strong>Numbe</strong>&lt;br&gt; 2</td>
<td><strong>Month(s)</strong>&lt;br&gt;Sem1 wk8&lt;br&gt;(online)&lt;br&gt;Jan exam</td>
<td><strong>Duration</strong>&lt;br&gt;1 hour&lt;br&gt;2 hours</td>
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<td><strong>Month(s)</strong>&lt;br&gt;Sem2 wk4&lt;br&gt;(online)&lt;br&gt;wk8 (online)&lt;br&gt;wk12 (online)&lt;br&gt;May/June</td>
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L/Outcomes
LO1, LO2, LO3, LO4

Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:
2 weeks after issue (formative assessment only – results are NOT used for the final assessment)

Resit Assessment Procedures:
2hr examination in August diet.

PLEASE NOTE:
Students need to gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam.
Recommended Reading

****Purchase essential; ***Purchase recommended; **Highly recommended reading; *Simply for reference (do NOT purchase)


Additional Student Feedback
(Please specify details of when additional feedback will be provided)

Informal individual and general feedback will be provided at regular tutorial sessions
Formal, summative feedback will be provided by the return of examination marks to students after assessment

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Session: 2014/15

Approved:

Course Director Signature: [Signature]

Date of Last Modifications: 15 August 2014
**Module Code:** ME403 / ME406  
**Module Title:** Engineering Materials Selection

**Brief Description of Assessment:**
Online quizzes will consist of multiple choice questions.
Examination (2hours) January diet.
Examination (2hours) May/June diet.

**Assessment Timing:-**
Indicate on the table below the start/submission dates for each assignment/project and the timing of each exam/assessment(s).

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